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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,347	08/23/2001	Scott J. Leslie	08EB03117/GP2-0197	6810

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EXAMINER	
JONES, HUGH M	

ART UNIT	PAPER NUMBER
2128	

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/682,347	LESLIE ET AL.	
	Examiner	Art Unit	
	Hugh Jones	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/7/2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-18 of U. S. Application 09/682,347, filed August 23, 2001, are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims recite thermal feasibility analysis, but this concept was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification merely appears to disclose, in broad terms, how to use the analysis, but does not disclose the analysis itself.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (1994) in view of Lee (2000), hence referred to as L94 and L00.

Lee et al. (1994) disclose "Application of a CFD tool for system-level thermal simulation." Lee et al. further disclose that a computational fluid dynamics (CFD) tool is used to evaluate the velocity and the temperature fields of air flow in a computer system enclosure. Simulations focused on the six printed circuit board regions, where approximately 37 W of power was generated on the component side of the board.

Lee (1994) does not expressly disclose considering plastic in the analysis.

Lee (2000) discloses, "An investigation of thermal enhancement on flip chip plastic BGA packages using CFD tool". Lee further discloses the advantage of applying Predictive Engineering in the thermal assessment of a 279 inputs/outputs (I/Os), six-layer, depopulated array flip chip PBGA package. Thermal simulation was conducted using a computational fluid dynamics (CFD) tool to analyze the heat transfer and fluid flow in a free convection environment. This study first describes the modeling techniques on a multilayer substrate, thermal vias, solder bumps, and printed circuit board (PCB). For a flip chip package without any thermal enhancement, more than 90%

of the total power was conducted from the front surface of the die through the solder ball interconnects to the substrate, then to the board. To enhance the thermal performance of the package, the heat transfer area from the backside of the die needs to increase dramatically. Several thermal enhancing techniques were examined. These methods included a copper heat spreader with various thicknesses and with thermal pads, metallic lid, overmolded with and without a heat spreader, and with heat sink. An aluminum lid and a heat sink gave the best improvement; followed by a heat spreader with thermal pads. Both methods reduced thermal resistance by an average of 50%. Detailed analyses on heat flow projections are discussed

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lee (1994) with the teaching of Lee (2000) because the temperature of the chips (which are plastic encapsulated) drive the temperature of the boards, which, in turn, drive the temperature of the enclosure.

7. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (1994) in view of Lee (2000) and in further view of Bahar (B).

Lee et al. (1994) disclose "Application of a CFD tool for system-level thermal simulation." Lee et al. further disclose that a computational fluid dynamics (CFD) tool is used to evaluate the velocity and the temperature fields of air flow in a computer system enclosure. Simulations focused on the six printed circuit board regions, where approximately 37 W of power was generated on the component side of the board.

Lee et al. (1994) does not expressly disclose considering plastic.

Lee (2000) discloses, "An investigation of thermal enhancement on flip chip plastic BGA packages using CFD tool". Lee further discloses the advantage of applying Predictive Engineering in the thermal assessment of a 279 inputs/outputs (I/Os), six-layer, depopulated array flip chip PBGA package. Thermal simulation was conducted using a computational fluid dynamics (CFD) tool to analyze the heat transfer and fluid flow in a free convection environment. This study first describes the modeling techniques on a multilayer substrate, thermal vias, solder bumps, and printed circuit board (PCB). For a flip chip package without any thermal enhancement, more than 90% of the total power was conducted from the front surface of the die through the solder ball interconnects to the substrate, then to the board. To enhance the thermal performance of the package, the heat transfer area from the backside of the die needs to increase dramatically. Several thermal enhancing techniques were examined. These methods included a copper heat spreader with various thicknesses and with thermal pads, metallic lid, overmolded with and without a heat spreader, and with heat sink. An aluminum lid and a heat sink gave the best improvement; followed by a heat spreader with thermal pads. Both methods reduced thermal resistance by an average of 50%. Detailed analyses on heat flow projections are discussed

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lee (1994) with the teaching of Lee (2000) because the temperature of the chips (which are plastic encapsulated) drive the temperature of the boards, which, in turn, drive the temperature of the enclosure.

Lee (1994) further does not disclose a thermal feasibility analysis over the internet.

Bahar discloses a method and system for mass-generating new or modified designs of products and other items over a communications network, such as the Internet. Users in the public may remotely access and run a computer design program on a remote host system where they may select and manipulate product parts for designated products, in order to create a new design for planned or existing products. Additionally, an award incentive is preferably provided to winning designs. In this manner, the remote host computer system may collect a multitude of design submissions from a great number of users.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lee with the teaching of Bahar because discloses (col. 1, line 44 to col. 2, line 10) the many advantages of carrying out a design over the internet.

8. As per the claim limitations, see:

Performing a thermal feasibility analysis for an enclosure containing electronics, the system comprising:

receiving design parameters related to the enclosure (L94: section II-III, V);

performing a thermal feasibility analysis for a plurality of enclosure designs in response to said design parameters and said thermal feasibility data, said enclosure designs varying in enclosure material, mounting location of the electronics and presence of a heat sink (L94: sections II-III, V),

said enclosure material including plastic and metal (L94: sections II-III, V; L00: section III: CFD modeling);

wherein said thermal feasibility analysis includes an electronics temperature range for each enclosure design, said displaying including displaying the electronics temperature range for each enclosure design graphically relative to a user-defined electronics temperature limit (L94: II-III, V); and,

wherein said thermal feasibility analysis includes an enclosure temperature range for each enclosure design, said displaying including displaying the enclosure temperature range for each enclosure design graphically relative to a material temperature limit (L94: II-III, V);.

providing results of the thermal feasibility analysis for said plurality of enclosure designs (L94: II-III, V);

a host System coupled to a network (B: fig. 1);

a database coupled to said host system, said database including thermal feasibility analysis data (B: fig. 1);

9. Any inquiry concerning this communication or earlier communications from the examiner should be:

directed to: Dr. Hugh Jones telephone number (703) 305-0023, Monday-Thursday 0830 to 0700 ET, ***or*** the examiner's supervisor, Kevin Teska, telephone number (703) 305-9704. Any inquiry of a general nature or relating to

the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to: Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 308-9051 (for formal communications intended for entry) ***or***

(703) 308-1396 (for informal or draft communications, please label "*PROPOSED*" or "*DRAFT*").

Dr. Hugh Jones

Primary Patent Examiner

August 22, 2004

HUGH JONES Ph.D.
PRIMARY PATENT EXAMINER
TECHNOLOGY CENTER 2100